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ABSTRACT

This report describes the cooperative activities of eight colleges/universities and four junior colleges using an IBM 370/145 system in central Mississippi. The Network provides the equipment with the accompanying educational effort, so as to allow each participating institution to become more aware of the academic implication of computers as they can affect curricula. Organizational structure, job responsibilities, hardware configuration, and program languages are briefly described. (DAG)

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REGIONAL EDUCATIONAL COMPUTING NETWORK
for
COLLEGES OF CENTRAL MISSISSIPPI

FINAL REPORT
1973-1977

A Technical Report Submitted to
the National Science Foundation
June, 1977

by

Dr. Jesse C. Lewis, Principal Investigator
NSF Grant EC-39578

In Behalf Of

Jackson State University
Alcorn State University
Copiah-Lincoln Junior College
East Central Junior College
Hinds Junior College
Millsaps College
Mississippi College
Mississippi Industrial College
Mississippi Valley State University
Rust College
Tougaloo College
Utica Junior College

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

IR005991

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ABSTRACT

This report covers the cooperative activities of eight four-year colleges and universities and four junior colleges. Seven of which are State-supported and five are private. The Network began operation with a IBM 360/40 computing system and is currently using an IBM 370/145 system. Jackson State University is the central site for the Network.

The purpose of the Network included providing appropriate equipment with accompanying educational effort, so as to allow each participating institution to become more aware of the academic implications of computers, with the ultimate goal of profoundly affecting basic curricula.

Most participating institutions have indicated that they are planning to continue Network activities at their own expense. Several institutions have purchased or are planning to purchase additional terminals in order to expand their Network activities.

Hence, the Network will continue on a self-sustaining basis. The staff of the Jackson State University Computing Center and the faculty of the Department of Computer Science will remain available to Network participants for consultation and assistance.

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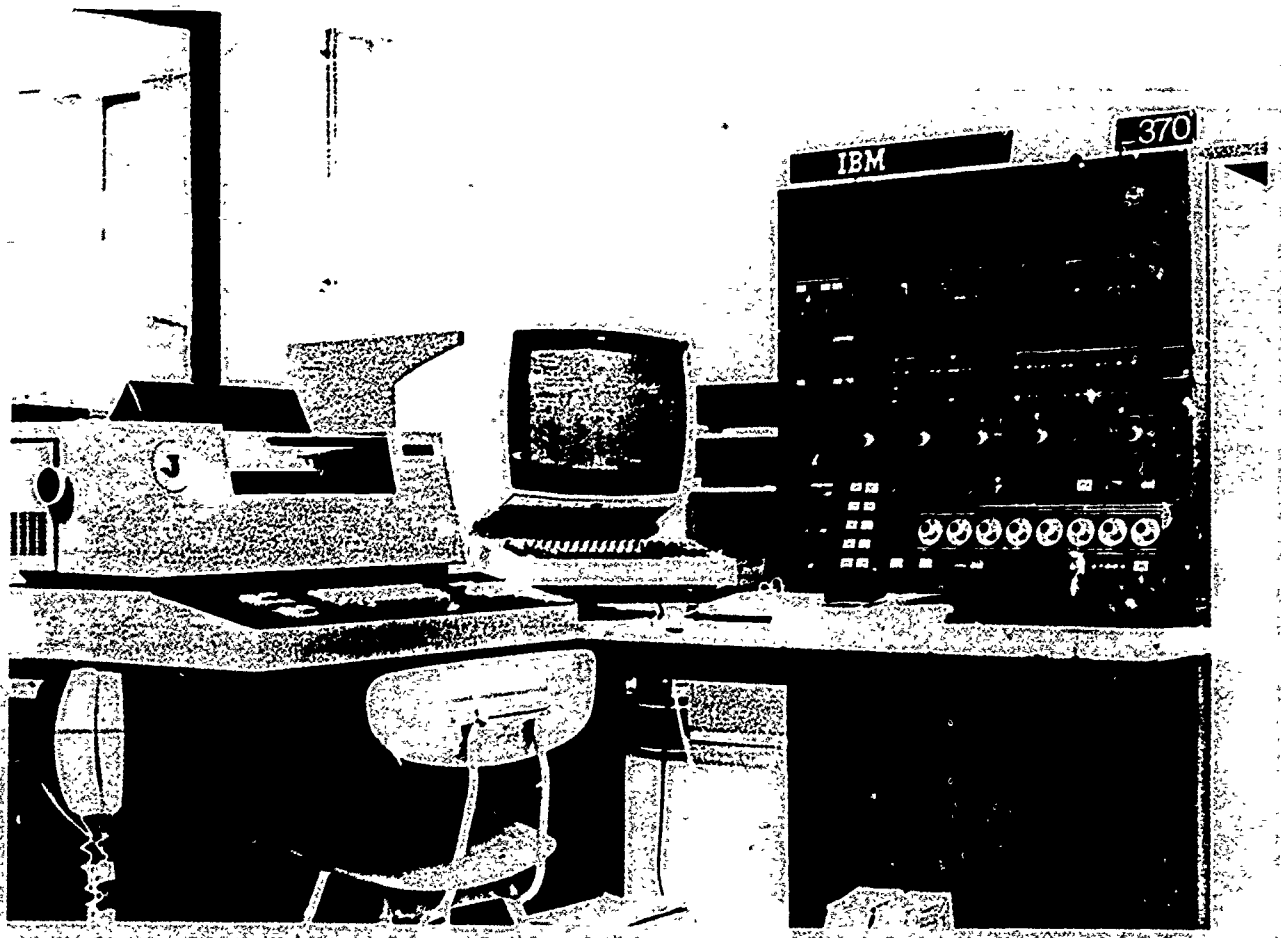


Jackson State University Computer System IBM 370/145

INTRODUCTION

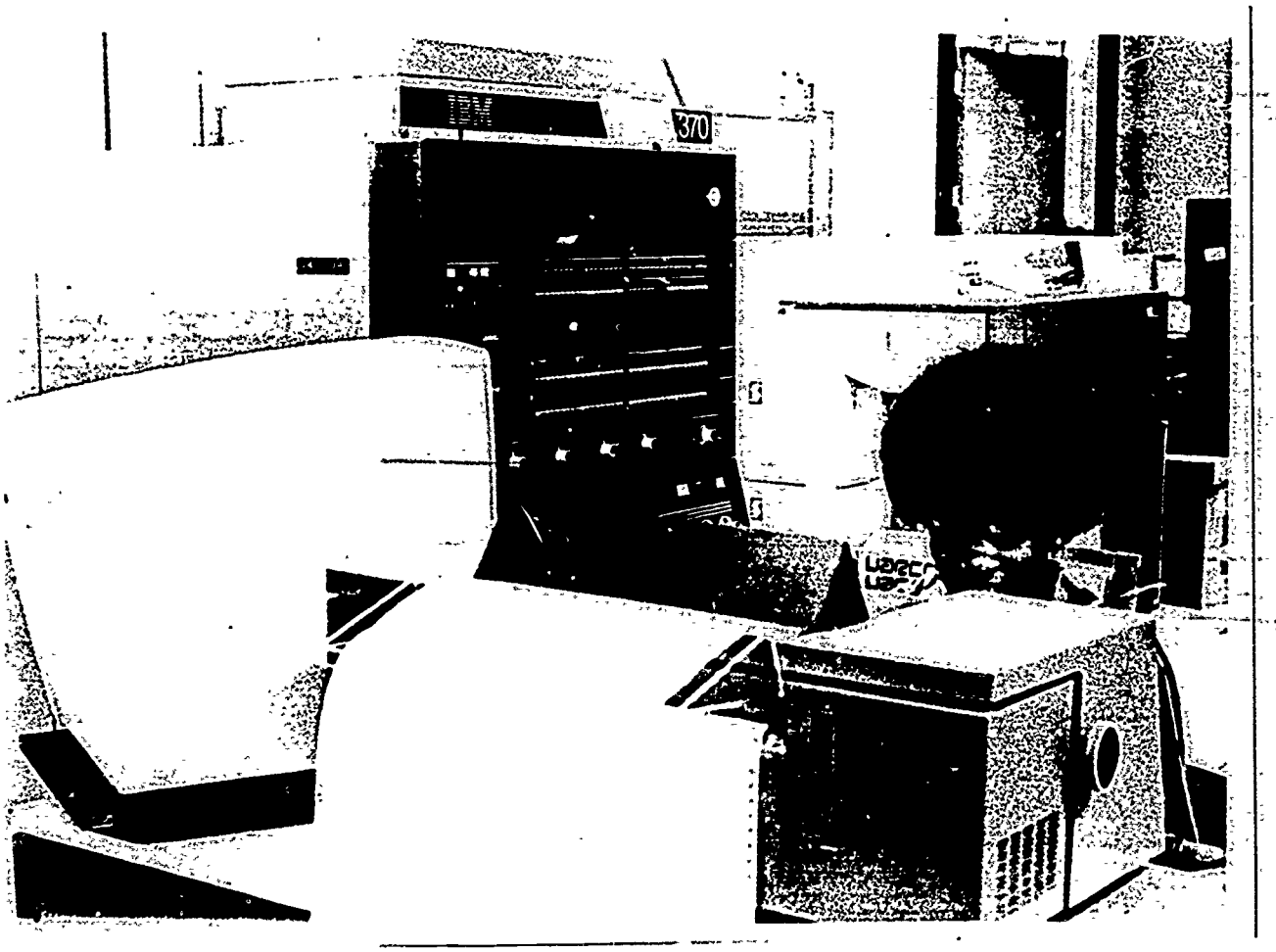
The Regional Educational Computing Network for Colleges in Central Mississippi (RECNCCM) began operation January 1, 1974 with eleven (11) other participating institutions. The participating institutions included five private 4-year colleges, two public 4-year colleges, and four public junior colleges. Five of the eleven participating institutions are traditionally black institutions.

Jackson State University acted as coordinator in planning and developing the Network and served as central site and lead institution in providing remote computing services and promoting curriculum development.

The National Science Foundation, in making a grant to Jackson State University to support an Educational Computing Network, allowed the University to become one of twenty-five such networks (See Figure 1). Jackson State received $340,400 and participating institutions received $101,265. Jackson State and participating institutions contributed $822,057 including services and equipment. Thus, the value of the project was $1,263,722.

The activities supported under this grant was part of a Foundation Program to explore the potential of computers in science education and research. The institutions listed below participated in this project, and

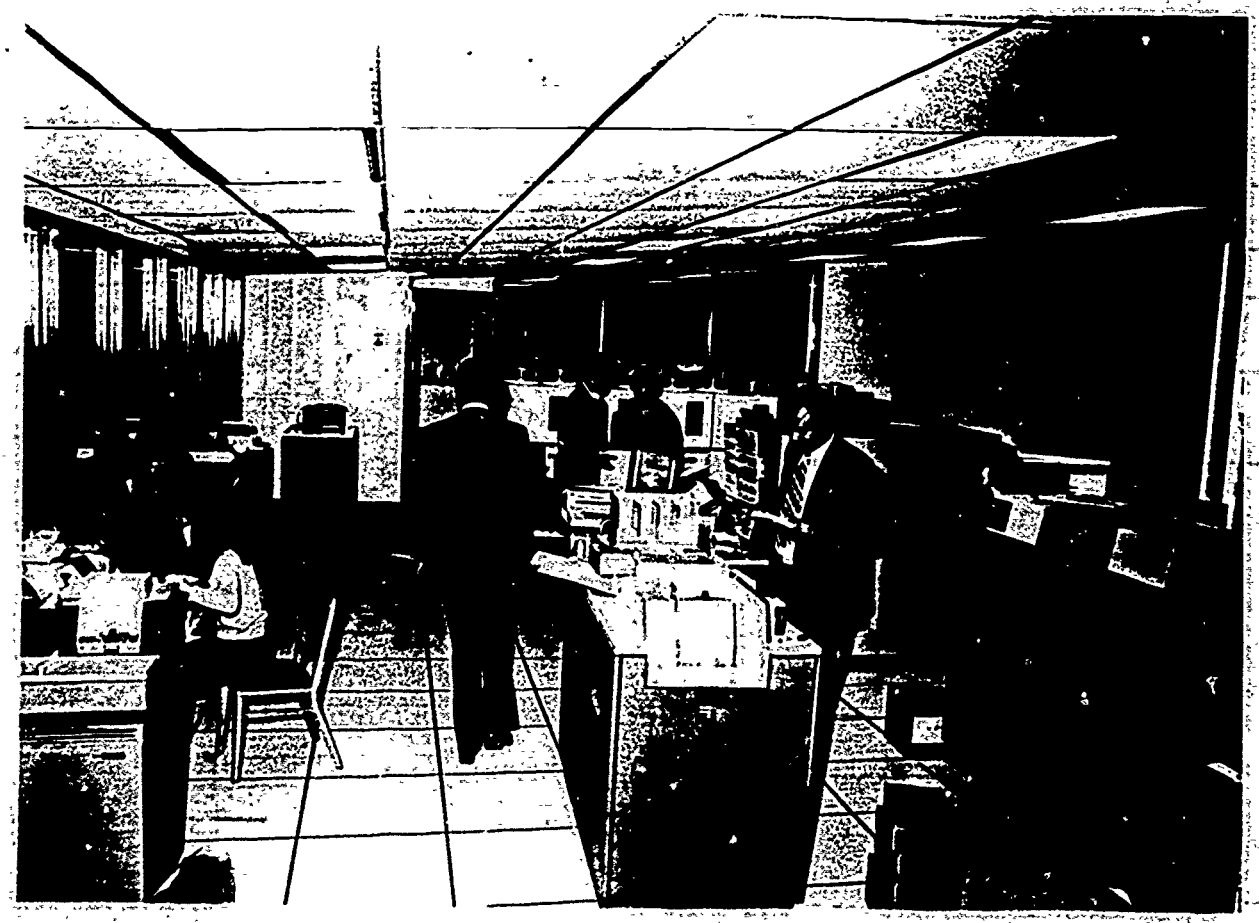
other institutions participated as the program developed and additional participation seemed desirable. Grants was awarded to the following institutions to support their participation in this project; Alcorn State University, Copiah-Lincoln Junior College, East Central Junior College, Hinds Junior College, Millsaps College, Mississippi College, Mississippi Industrial College, Mississippi Valley State University, Rust College, Tougaloo College and Utica Junior College.



Jackson State University-Student Operator Trainee

OBJECTIVES OF THE NETWORK ACTIVITIES

The objectives of the Regional Educational Computing Network program was to provide the appropriate equipment, with an accompanying massive educational effort, so as to allow each participating college to become more aware of the academic implication of computers, with the ultimate goal of profoundly affective basic curricula. It was expected that the Network institutions would modify and augment curricula be adding computer science courses and introducing computer methods into established programs.



Jackson State University Computing Center

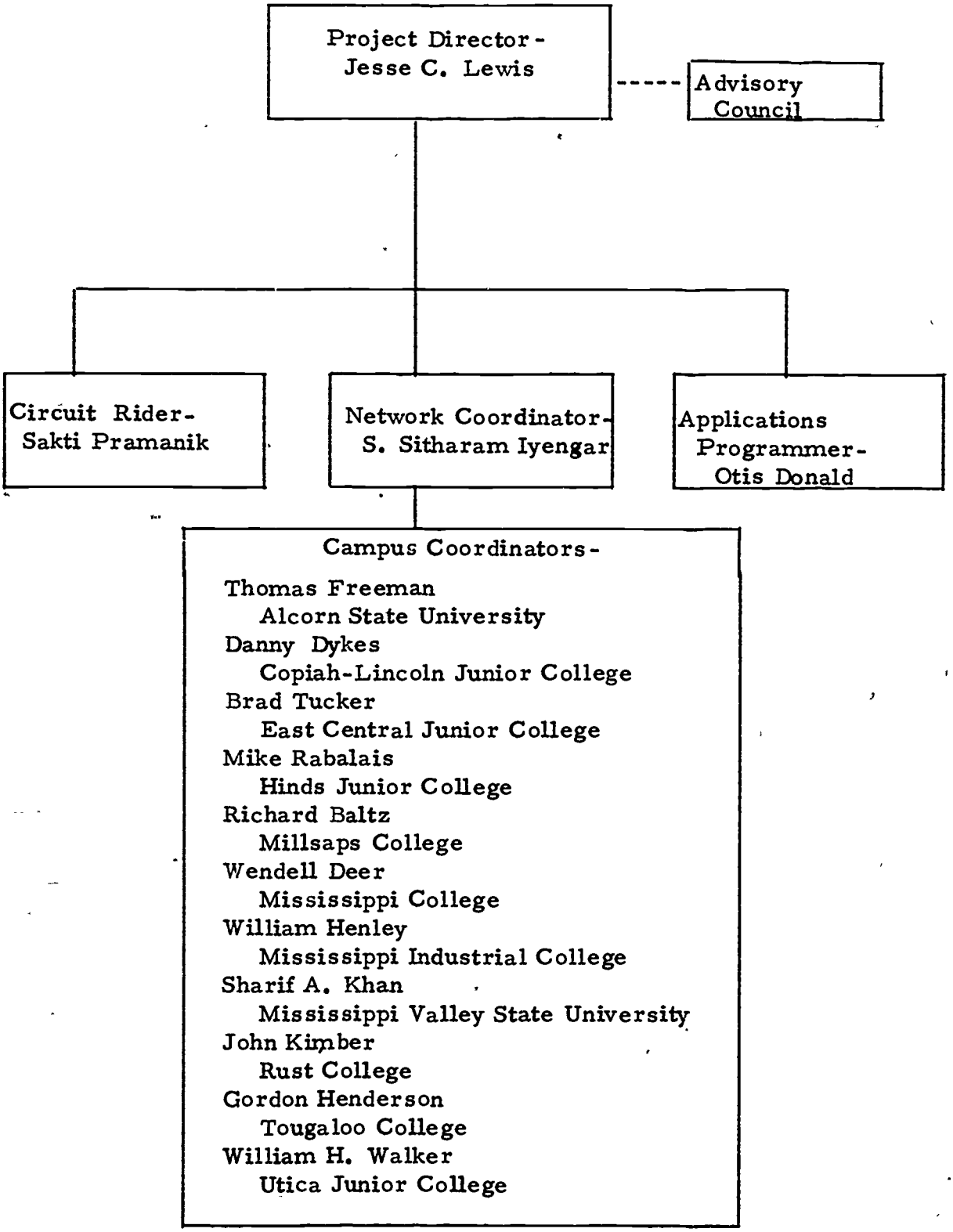
Participating Institutions

In 1972 when the Network was planned and proposed to the National Science Foundation, the lead institution, Jackson State University, had an enrollment of 5101. The current enrollment is approximately 8000.

Table 1. Participating Institutions

Name/Location	1972 Enrollment	Type	Previous Ethnic Background
Alcorn State University Lorman, Mississippi	2677	Public	Black
Copiah-Lincoln Junior College Wesson, Mississippi	890	Public	White
East Central Junior College Decatur, Mississippi	778	Public	White
Hinds Junior College Raymond, Mississippi	7000	Public	White
Millsaps College Jackson, Mississippi	969	Private	White
Mississippi College Clinton, Mississippi	1918	Private	White
Mississippi Industrial College Holly Springs, Mississippi	350	Private	Black
Mississippi Valley State University Itta Bena, Mississippi	2410	Public	Black
Rust College Holly Springs, Mississippi	695	Private	Black
Tougaloo College Tougaloo, Mississippi	750	Private	Black
Utica Junior College Utica, Mississippi	714	Public	Black

NETWORK ORGANIZATION



The Terminal Manager (Campus Coordinator) was appointed at each institution by that institution's administration with guidelines from Jackson State University. Some of the appointees are well experienced with computers, but some had no experience, and all needed additional knowledge and training concerning the Jackson State University computer system.

The campus coordinator was the campus terminal manager, innovator, computer expert and the contact with Jackson State University.

The job responsibilities of the Principal Investigator*, Network Coordinator (Circuit Rider), the Programming Staff, the Board of Curriculum Experts, Campus Computer Coordinator, and the Board of Campus Coordinators are as follows:

Network Coordinator (Circuit Rider)

This was a full-time position entailing close communication with all colleges, hence, involving quite a bit of travel.

Responsibilities

a. Supervise the planning and scheduling of the summer sessions.
b. Serve the remote colleges to help with problems and in every way possible to make the cooperative effort a success.
c. Invigorate the campus college coordinator, seeing to it that he was pushing the effort in his campus.
d. Represent the needs of the remote college to Jackson State University Computer Center.
e. Visit all regional campuses on a regular or requested basis to consult with interested faculty and administration.
f. Help the campus coordinator to perform his functions.
g. Assist in evaluating the joint regional effort.

*Principal Investigator provides overall direction to the project in accordance with the standard NSF definition of grantee leadership.

h. Coordinate the curriculum workshops if held centrally and help publicize workshops held on regional campuses.

Jackson State University Programming Staff

Responsibilities

a. Supervise interfacing of all terminals to the 370/145.
b. Provide all system programming effort needed to allow batch processing, essentially on demand, at the same time creating minimum degradation of the system to network users. Assistance from and cooperation with Jackson State Systems Programming Staff was available.
c. Provide time accounting records to the regular time accounting programs.
d. Liaison with Systems and Operating Staff to insure quality service.
e. Establish operating procedures for handling remote terminals.
f. Provide paid programming service to remote users.

Board of Curriculum Experts

This was a rather large committee, initially consisting of Jackson State University faculty members from diverse fields who had been strong users of computers in research and in class work. As similar experts were identified on the remote campuses, they were included on the Board.

Responsibilities

a. Primary responsibility was to advise the remote shcools on possible ways to involve the use of a computer in the curriculum.
b. In small subject matter task forces, this board gave advice in depth when requested by the Network Coordinator or Campus Coordinator, on topics confined to a single discipline's use of a computer.
c. Participate in the summer sessions at the request of the Network Coordinator.
d. Assist in drawing up evaluation techniques, and assist in evaluation.
e. Initiate appropriate currimulum efforts based on defined needs.

The Campus Computer Coordinator (Terminal Manager)

This person was the key to the success of the regional cooperative effort. He had an insight and spirit concerning the use of the computer at his school. This fervor was tempered by the individual's acceptance as a faculty member who could get along with most members of the faculty. This person devoted full time to the enterprise, so that all his efforts would be to improve the system.

Responsibilities

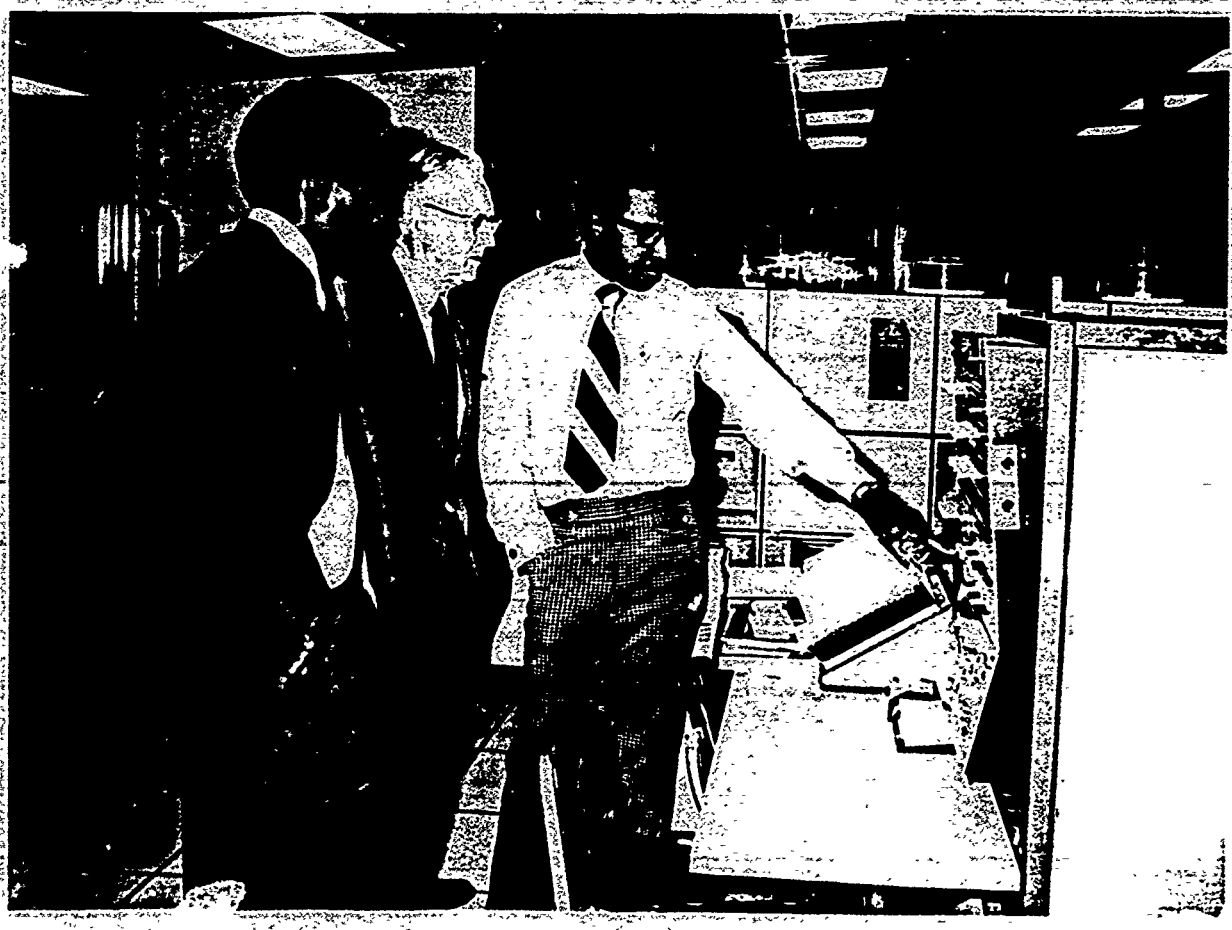
a. The primary and over-riding responsibility was to everything to make the use of a remote terminal on his campus a huge success.
b. The Campus Coordinator was in charge of the physical property, including the remote terminal, data phones, and associated unit record equipment.
c. Provide an appropriate operating staff.
d. Assist all users with problems.
e. Seek appropriate Jackson State University assistance through the Network Coordinator or the Computing Center staff.
f. Conduct short courses on programming; a range seminars on the use of computers in classes; give demonstrations.
g. Participate in the summer sessions, coordinator workshops, and other training functions.
h. As a member of the Board of Coordinators, assist in the evaluation of the experiment's success.
i. Cooperate with the Network Coordinator, and use him as the Jackson State University contact.

Board of Campus Coordinators

This group provided an organized sounding board to the coordinator for a mutual exchange of ideas; and constituted a formal voice of the remote campus to the central site. The Network Coordinator served as Chairman.

Responsibilities

a. To represent the remote campuses corporately.
b. To advise the Network Coordinator about broad policy.
c. To devise, with the Network Coordinator and Board of Curriculum Experts, a suitable set of evaluative techniques; and actually participate in the evaluation.



From left to right, Dr. John Peoples, Jr, President of JSU and Mr. W. M. Shoemaker, Vice President of Board of Trustees observes as Dr. Jesse C. Lewis, Computing Center Director, discuss features of the Computer (360/40) which was replaced in 1976 with a 370/145.

HARDWARE CONFIGURATION

The Network began operations January 1, 1974 with the following equipment:

IBM	360/40 CPU-384K
IBM	2540 Card Read/Punch
IBM	2501 Card Reader
IBM	1403 Printer-1100 LPM
IBM	(6) 2319 Disk Drives
IBM	2701 Data Adapter Unit
IBM	2702 Data Communication Unit
TI	(20) Keyboard/Printer Terminals (10-30 characters per second)

The terminals used by the participating institutions are the Texas Instrument Silent 700 KSR and ASR Model 733. These models utilize USASC II code, switch selectable speed of 10, 15, and 30 characters per second. The table below show the number of terminals at each participating institution.

College	No. of Terminals
Alcorn State University	2
Copiah-Lincoln Junior College	1
East Central Junior College	1
Hinds Junior College	2
Millsaps College	1
Mississippi College	2
Mississippi Valley State University	2
Mississippi Industrial College	0
Rust College	0
Tougaloo College	1
Utica Junior College	1
Jackson State University	7

During the second year of operations, the IBM 2702 Data Communication Unit was replaced by an IBM 3705 Communication Controller Unit. This made it possible to increase the speed of the

terminals from 10 to 30 characters per second. Shortly after the installation of the IBM 3705, the leased lines to institutions outside the Jackson, Mississippi telephone exchange were replaced by an In-WATS system. This resulting in a considerable improvement in the cost-effectiveness of the Network operations. A 768K IBM 370/145 computing system was installed in August, 1976 replacing the IBM 360/40 system. At the same time, the IBM 2319 Disk Drives were replaced by CDC 3330s.

This represented a significant upgrade--increasing speed, performance and capacity.

The table below shows the equipment located at the participating institutions at the beginning of the project.

Table 2. Equipment at Participating Institutions

INSTITUTION	EQUIPMENT
Alcorn State University	IBM 1130 (16K, 2 Disks)
Copiah-Lincoln Junior College	IBM 1620
East Central Junior College	IBM 1620
Hinds Junior College	IBM 1620
Millsaps College	IBM 1130 (Model 4)
Mississippi College	IBM 1130
Mississippi Industrial College	None
Mississippi Valley State University	IBM 360/20 also use 360/40
Rust College	None
Tougaloo College	IBM 1130
Utica Junior College	None

Some of the participating institutions have upgraded their on-campus facilities since the Network started.

LANGUAGES AND THE COMMON LIBRARY

At the beginning of the project, participating institutions were limited to two interactive languages, BASIC and PL/1. The index of programs in the Common Library is shown below. The index gives the program name, the language in which the program is written, and a brief description of each program:

BUSINESS

BUSINESS ANALYSIS/BASIC PACKAGE-Run the (BASIC) program and to obtain a list of the modules in this package.

CHEMISTRY

ARO (BASIC) - Electrophilic Substitution; Simulated Syntheses.

ECONOMICS

ECO (BASIC) - A Model of the U. S. Economy
EHK (BASIC) - A Hicksian (IS=LM) Exercise
EM1 (BASIC) - A Spending Multiplier Exercise
EMA (BASIC) - A Multiplier-Accelerator Exercise

GAMES AND MIND TEASERS

BJK (BASIC) - A Blackjack Game (The computer is the dealer)
CRP (BASIC) - Shoot Dice with the Computer
MAZ (BASIC) - Constructs a Maze of any size up to 25 x 23
NIM (BASIC) - The Game of NIM
RCE (BASIC) - Horse Race Simulation
TIC (BASIC) - The Game of TIC- TAC- TOE

MATHEMATICS

MATH/BASIC PACKAGE - Run the (BASIC) program CNT to obtain a list of the modules in this package.

PHYSICS

BD3 (BASIC) - 3-Body Motions (Computers (X, Y, Z) of three bodies under the influence of their mutual gravitational attraction).

D2F (BASIC) - 2-Dimensional motion (computes (x, y) of of a mass in a gravitational field with source at (0, 0).)

SIMULATION

PRM (IPLI) - A random-number generating function for PL/1 (NOTE: The user must declare RDM as an entry and EX as a file in his main program)

STATISTICS

STAT/BASIC PACKAGE - Run the (BASIC) program CNS to obtain a list of the modules in this package.

The breakdown of participating faculty users of the Common Library by discipline association was calculated to be roughly as follows:

Biology	2
Business & Accounting	7
Chemistry	6
Computer Science & Data Processing	8
History	1
Economics	5
Education	2
Engineering	2
Mathematics	13
Physical Science	2
Physics	3
Pyschology	3
Social Sciences	3

NOTE: The above figures include faculty who participated but for whom NSF funds was not requested.

The McGill University System for Interactive Computing (MUSIC) was installed at the beginning of the 1976-77 academic year to enhance capabilities. MUSIC is a high performance, multi-access, timesharing system that offers many languages and features normally found in larger systems. By combining the full functions of multiple languages and interactive capabilities with demonstrable dependability, MUSIC has proven to be particularly suitable for the educational environment due to its ease of use. MUSIC operates in a virtual machine under VM/370 (without the need for DOS or OS), and takes advantage of many of the Control Program functions, thereby reducing the total system overhead and making the facilities very responsive to the several users. The system can support up to 250 concurrent terminal users, including a local batch capability, with the ability to create and maintain library files of programs or data and to compile and execute programs in several languages. The following language processors are available in the standard program:

FORTRAN G1
BASIC
APL
ANS COBOL
ASSEMBLER F

In addition, the MUSIC Statistical System STATPAK, is available to allow the user to solve his statistical problems conversationally on a terminal. This system is programmed so that students with a minimal knowledge of computer operation or programming experience will be able to make use of applications such as analysis of variance, factor analysis, multiple regression, and exponential smoothing.

A text processing facility, MUSIC/SCRIPT, is also included with the system. MUSIC/SCRIPT is useful in the publication and updating of documents. It can perform left and right margin adjustment of text entered from a terminal, card reader, or produced by a program. Output from this program may be printed directly on the terminal or batch printer or may be directed to a user data set or save library file.

Additional languages and application packages are being made available to MUSIC users by the several users who have implemented the system. Those capabilities that are available, in addition to the standard offering, are ALGOL-W, PL/C (an on-line PL/1 processor designed for student use), WATFIV (the well known student FORTRAN compiler developed at the University of Waterloo), SPSS (Statistical Package for the Social Sciences), COGO (the civil engineering program that solves coordinate geometry problems), and GPSS (General Purpose Simulation System).

Since the development philosophy of MUSIC was to be able to service non-programmers, the command language was designed with ease of use as a key criterion. No Job Control Language is involved in using the system. The command language is conversational and English language oriented. The system also has a deductive. This means that if a user inputs a command which the system does not recognize, it assumes the characters presented ate the name of a program; a search is made of the Save Library for a program with that name (which applies to that terminal user's code); the program is loaded and executed.

Abbreviations are optional and commands can be as brief as a single character. As long as the system can recognize the string as unique, the command can be recognized and executed.

The same command language is used for batch processing so even when a user needs to input jobs through a card reader, he need not use Job Control Language. (In the batch mode, files in the Save Library may not be updated from the batch terminal). With this capability available to student users, it is anticipated that a large number of student batch jobs will be run under MUSIC, thereby reducing the total load on the production batch (DOS/VS) virtual machine.

Jackson State University-Computer Data Terminal Room